

Claims

I claim:

1. A VSTOL vehicle comprising:

a fuselage shaped to develop aerodynamic lift in a horizontal flight;

a plurality of ducts, rigidly connected to said fuselage, which are positioned around center of mass of said vehicle, and whose center axes are at various fixed angles between, but substantially different from, said vehicle's vertical and longitudinal axes, such that full three dimensional attitude control can be achieved with torques produced by varying thrusts from said ducts; each said duct having inside a rotor which rotates about the longitudinal axis of the duct to generate independent streams of airflow for propelling and stabilizing said vehicle, each said duct has a total axial length, as measured from the opening of the duct to its aft end where air flow exits, of at least more than half the diameter of the rotor inside said duct.

a plurality of power plants and transmission means for conveying the rotational energy from said power plants to the said rotors;

control means for coordinating the power generated by the power plants to maintain the balance and stability of said vehicle and to rotate and move said vehicle in any direction.

2. A VSTOL vehicle as in claim 1 further comprising means for generating and maintaining substantially high level of angular momentum whereby said vehicle is substantially stabilized through the gyroscopic effect.

3. A VSTOL vehicle as in claim 1 wherein said rotors and said power plants store substantially high level of kinetic energy whereby said vehicle can substantially utilizes the stored kinetic energy to assist takeoff and emergency landing.

4. A VSTOL vehicle as in claim 1 further comprising a plurality of wheels allowing said vehicle to drive on land and transmission means for conveying rotational power from said power plants to said wheels.

5. A VSTOL vehicle as in claim 1 further comprising a plurality of wings, and means for rotating said wings from a first position fully retracted

under the fuselage to a second position fully extended whereby substantial upward lift is generated during forward flight.

6. A VSTOL vehicle as in claim 1 wherein the side and bottom of said vehicle is shaped to utilize the ground effect during takeoff, landing and hover mode near ground.

7. A VSTOL vehicle as in claim 1 wherein the shape and weight of said vehicle is designed to float on water, whereby said vehicle can take off and land on water surface.

8. A VSTOL vehicle comprising:

a fuselage shaped to develop aerodynamic lift in a horizontal flight;

two pairs of ducts, fully enclosed fore and aft of said fuselage respectively, rigidly connected to said fuselage, which are positioned around center of mass of said vehicle, and whose center axes are at various fixed angles between, but substantially different from, said vehicle's vertical and longitudinal axes, such that full three dimensional attitude control can be achieved with torques produced by varying thrusts from said ducts; each said duct having inside a rotor which rotates about the longitudinal axis of the duct to generate independent streams of airflow for propelling and stabilizing said vehicle, each said duct has a total axial length, as measured from the opening of the duct to its aft end where air flow exits, of at least more than half the diameter of the rotor inside said duct.

a plurality of power plants and transmission means for conveying the rotational energy from said power plants to the said rotors;

control means for coordinating the power generated by the power plants to maintain the balance and stability of said vehicle and to rotate and move said vehicle in any direction.

9. A VSTOL vehicle as in claim 8 further comprising means for generating and maintaining substantially high level of angular momentum whereby said vehicle is substantially stabilized through the gyroscopic effect.

10. A VSTOL vehicle as in claim 8 wherein said rotors and said power plants store substantially high level of kinetic energy whereby said

vehicle can substantially utilizes the stored kinetic energy to assist takeoff and emergency landing.

11. A VSTOL vehicle as in claim 8 further comprising a plurality of wheels allowing said vehicle to drive on land and transmission means for conveying rotational power from said power plants to said wheels.

12. A VSTOL vehicle as in claim 8 further comprising a plurality of wings, and means for rotating said wings from a first position fully retracted under the fuselage to a second position fully extended whereby substantial upward lift is generated during forward flight.

13. A VSTOL vehicle as in claim 8 wherein the side and bottom of said vehicle is shaped to utilize the ground effect during takeoff, landing and hover mode near ground.

14. A VSTOL vehicle as in claim 8 wherein the shape and weight of said vehicle is designed to float on water, whereby said vehicle can take off and land on water surface.